

Predictors of Mental and Physical Health Service Utilization Among Vietnam Veterans

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This study investigated predictors of mental and physical health care service utilization among 1,632 male ($n = 1,200$) and female ($n = 432$) Vietnam veterans who participated in the National Vietnam Veterans Readjustment Study. Using Anderson's theory as a model (Anderson & Bartkus, 1973), the authors examined both direct and mediated relationships among predisposing factors (i.e., age, marital status, and combat exposure), enabling factors (e.g., household income and insurance), and need factors (e.g., medical and psychological symptomatology) and physical and mental health care utilization outcomes. Need factors were the most consistent and strongest mediators of predisposing variables for both physical and mental health care service utilization, although there were differences between male and female veterans. For men, combat exposure indirectly predicted mental health care utilization through the need variables (with the effects of posttraumatic stress disorder being greatest). For women, physical health problems mediated the relationship between combat exposure and physical health outpatient care utilization. These findings have implications for screening and outreach efforts.

Keywords: posttraumatic stress disorder (PTSD), veterans, service utilization, health

Health service utilization is an intricate process involving a number of variables that may be interrelated in complex ways. One extant framework for conceptualizing service utilization is the Anderson model (Andersen, 1995; Anderson & Bartkus, 1973), which incorporates predisposing factors (e.g., demographic variables and combat exposure), enabling factors

(e.g., household income and insurance), and need factors (e.g., medical and psychological symptomatology). Studies using the Anderson model have indicated that need characteristics are most salient in determining health care utilization (Bland, Newman, & Orn, 1997; Evashwick, Rowe, Diehr, & Branch, 1984; Kessler, Olfson, & Berglund, 1998; Leaf et al.,

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1988; Wolinsky & Coe, 1984; Wolinsky et al., 1983), with predisposing and enabling characteristics accounting for little additional variance (Arling, 1985). Two recent reviews have confirmed that need variables, such as posttraumatic stress disorder (PTSD) and higher levels of psychopathology, are the most important factors in mental health care service utilization (Elhai, North, & Frueh, 2005; Gavrilovic et al., 2005). However, studies incorporating the Anderson model have typically evaluated utilization through additive, linear techniques rather than testing more intricate and interrelated networks. Relying on single-equation models and hierarchical, additive approaches does not account for indirect, mediating effects and may obscure the relationships in such models (Arling, 1985; Johnson & Wolinsky, 1993). Overall, the full extent of the relationships between predisposing, enabling, and need characteristics have not been thoroughly examined in modeling service utilization (Mechanic, 1979; Penning, 1995). In this study, we examined the relationships among predisposing, enabling, and need characteristics using structural equation modeling in a large, nationally representative Vietnam veteran sample.

Military veterans are a unique population with regard to health outcomes. Generally, soldiers are assumed to be in good physical and mental condition at the time of entry into the military, and individuals with reported mental disorders or physical impairments are often screened out. During deployment, soldiers may be exposed to potentially traumatic events, incur war-related injuries, or be exposed to noxious agents (e.g., nerve gas, Agent Orange, other chemical toxins) that lead to complicated health problems. PTSD may develop following exposure to trauma and is particularly prevalent in individuals exposed to war (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Kulka et al., 1990). PTSD symptoms may also be associated with physical health complaints and morbidity in samples of veterans and the general population (Dobie et al., 2004; Litz, Keane, Fisher, Marx, & Monaco, 1992; Kimerling & Calhoun, 1994; McFarlane, Atchison, Rafalowicz, & Papay, 1994). In addition, physical health symptoms may be associated with posttraumatic stress symptoms up to 20 years after trauma exposure (Boscarino, 1997; Elder, Shanahan, & Clipp, 1997; Neria &

Koenan, 2003; Solomon, 1988; Solomon & Mikulincer, 1987).

Despite evidence for increased physical health symptoms and morbidity in association with PTSD symptomatology, the relationship between PTSD and health care utilization remains unclear. Some studies have demonstrated that need factors in trauma survivors predict service use and that those with PTSD use health care services more frequently than their non-PTSD counterparts. For example, using the National Vietnam Veterans Readjustment Study (NVVRS) database, Rosenheck and Fontana (1995) found that Vietnam veterans with PTSD were more likely than those without PTSD to use both mental and physical health care services. Overall, PTSD is generally associated with increased mental health care service utilization (Boscarino, Galea, Ahern, Resnick, & Vlahov, 2002; Calhoun, Bosworth, Grambow, Dudley, & Beckham, 2002; Franklin, Young, & Zimmerman, 2002; Greenberg et al., 1999; Rosenheck & Fontana, 1995) and increased medical care service utilization (Calhoun et al., 2002; Marshall, Jorm, Grayson, Dobson, & O'Toole, 1997; Marshall, Jorm, Grayson, & O'Toole, 1998; Walker et al., 2003). However, there is also some evidence to the contrary; Cradock-O'Leary, Young, Yano, Wang, and Lee (2002) found that veterans with a variety of chronic psychiatric illnesses, including PTSD, are at high risk of not receiving general medical services as compared with those without a mental health disability.

There is also some research examining comparative frequencies of use of physical as compared with mental health care in those with PTSD, although existing studies have yielded conflicting results. Some have argued that because avoidance of trauma is a hallmark symptom of PTSD, those who could benefit from mental health care focus on physical health concerns instead (e.g., Davidson, Stein, Shalev, & Yehuda, 2004). Another point of view is that eventually seeking mental health care is unavoidable, given the debilitating nature of PTSD, even if seeking such care may take time. Although some studies have found that veterans with PTSD seek and use mental health care services more frequently than physical health care services (Kramer, Booth, Han, & Williams, 2003; Marshall, Jorm, Grayson, & O'Toole, 1998), others have found that those with PTSD

are more likely to seek physical health care services (Deykin et al., 2001; Kulka et al., 1990; Schnurr, Friedman, Sengupta, Jankowski, & Holmes, 2000). Even though some studies have found higher rates of physical health care utilization, relative utilization of mental health care may still be substantial. For example, Calhoun et al. (2002) determined that although general physical health care utilization among veterans with PTSD was more than 2.5 times higher than mental health care utilization, the rate at which veterans with PTSD sought mental health care was also considerable.

Given the seemingly complex relationships between PTSD, physical health, and mental health care utilization, several mediated relationships have been suggested. A number of studies have found that PTSD mediated the relationship between trauma exposure and physical health outcomes (Friedman & Schnurr, 1995; Kimerling, Clum, & Wolfe, 2000; Schnurr & Spiro, 1999; Taft, Stern, King, & King, 1999). Similarly, Wolfe, Schnurr, Brown, and Furey (1994) determined that PTSD contributed more to poor physical health than did combat exposure. Furthermore, Deykin et al. (2001) found that the relationship between PTSD and health care utilization was mediated by physical health symptoms.

Several predisposing characteristics have been examined as potential predictors in previous studies. According to Hankin, Spiro, Miller, and Kazis (1999), younger veterans who reported greater trauma exposure were more likely to report receiving mental health treatment than were others who screened positively for mental disorders. Similarly, in a community sample, Greenley, Kepecs, and Henry (1982) determined that users of mental health care services were younger than nonusers. Although the majority of studies have demonstrated that older age predicts greater mental health care utilization (Boscarino et al., 2002; Calhoun et al., 2002; Goto, Wilson, Kahana, & Slane, 2002; Koenen, Stellman, & Stellman, 2003), others have found that age is not associated with utilization (Frueh et al., 2004; New & Berliner, 2000). Similarly, although some studies have reported increased mental health care utilization among those who are married or live with their partners (Boscarino et al., 2002; Koenen et al., 2003; Norris, Kaniasty, & Scheer, 1990), others have found that unmarried veterans were more

likely to use psychiatric services (Williams, Weiss, Edens, Johnson, & Thornby, 1998). To complicate matters further, other studies have reported no relationship between marital status and service utilization (Ullman & Brecklin, 2002).

Although there is limited research on the topic, enabling factors also seem to play a role in health care service use among those exposed to trauma. Among veterans, those who are service connected for a disability used outpatient physical health care services more frequently than those who were not service connected (Calhoun et al., 2002). Conversely, unemployed individuals reported both greater general health care service use (Rosenheck & Massari, 1993) and mental health care service use (Havassy & Hopkin, 1989; Koenen et al., 2003). Boscarino et al. (2002) reported that overall income was not significantly related to mental health care service use.

As a result of the conflicting evidence concerning the importance of predisposing, enabling, and need factors, and because of the dearth of studies that have examined these relationships within a more complex, nonlinear, multivariate framework, in this study we used the NVVRS database to examine the importance of each set of variables. Using Anderson and Bartkus's (1973) theory as a model, we examined both direct and mediated relationships using predisposing factors (i.e., age, marital status, and combat exposure), enabling factors (e.g., household income and insurance), and need factors (e.g., medical and psychological symptomatology) to predict medical and mental health care use.

In structuring our models, we tested predictors of medical and mental health care use separately for male and female veterans, especially given that gender differences have consistently been found with multivariate models examining relationships among NVVRS variables (e.g., D. W. King, King, Gudanowski, & Vrenen, 1995; D. W. King, King, Foy, & Gudanowski, 1996; L. A. King, King, Fairbank, Keane, & Adams, 1998; Taft, Stern, King, & King, 1999). Furthermore, among participants in this national sample, women were relatively older than men at the time of deployment and less ethnically diverse, more educated, of higher rank, and more likely to volunteer for service in Vietnam. Finally, there is also some evidence that there are gender differences in use of mental health

care services among veterans, with female veterans underusing VA mental health care services (e.g., Hoff & Rosenheck, 1998a, 1998b). However, because most veteran health care studies sample only men, few studies can provide an accurate picture concerning gender differences in female veterans. Overall, we tested a variety of direct and unstandardized indirect effects for each of the components of Anderson and Bartkus's (1973) model and modeled these equations separately for male and female veterans.

Method

Data Source

Data were drawn from Vietnam veterans ($N = 1,632$) who participated in the NVVRS (1,200 male veterans, 432 female veterans). All had served in the Vietnam theater of operations sometime between August 1964 and March 1975. During an extensive interview and self-report session, participants provided information on a broad range of topics including demographics (e.g., age and race), financial resources (e.g., income and insurance availability), global psychiatric and physical health symptoms, PTSD severity, and mental and physical health care service utilization. Data were collected between November 1986 and February 1988. Detailed information regarding data collection methodology and sample characteristics are described elsewhere (Kulka et al., 1990; Jordan, Schlenger, Hough, & Kulka, 1991; Schlenger et al., 1992; Weiss et al., 1992).

Measures

For this study, variables were categorized as predisposing variables, enabling variables, need variables, and service utilization variables.

Predisposing variables included age, race (0 = *White*, 1 = *non-White*), marital status (0 = *unmarried*, 1 = *married*), and combat exposure. The combat exposure measure was a 36-item scale (D. W. King et al., 1995) assessing a myriad war-related experiences and situations (e.g., frequency of firing a weapon and how frequently respondents saw Americans being killed or injured). Owing to differences in the number of item-response options, responses were converted to z scores

and then summed to produce an overall score, with higher scores indicating more intense combat exposure ($\alpha = .86$).

Enabling variables included family income measured as an ordinal variable (1 = *nothing*, 21 = *more than \$50,000*) and access to insurance (0 = *no*, 1 = *yes*).

Need variables included total number of psychiatric diagnoses, average number of physical health conditions, and PTSD severity. Total number of psychiatric diagnoses was calculated from the Diagnostic Interview Schedule (Robins, Helzer, Croughan, & Ratcliff, 1981) for the *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed., rev., or *DSM-III-R*; American Psychiatric Association, 1987). Average number of physical health problems in the past 12 months was computed from a measure of 32 conditions for men (1 gender specific) and 36 conditions for women (5 gender specific). Number of physical health problems was standardized to permit comparisons across gender. PTSD symptom severity was assessed using the Mississippi Scale for Combat-Related PTSD ($\alpha = .94$; Keane, Caddell, & Taylor, 1988).

Service utilization variables included mental health care service utilization, physical health inpatient care utilization, and physical health outpatient care utilization. Mental health care service utilization was assessed by whether (0 = *no*, 1 = *yes*) respondents received treatment for psychiatric concerns (i.e., problems related to "nerves," mental health, or drugs and alcohol) during the past 6 months. Physical health inpatient care utilization reflected whether (0 = *no*, 1 = *yes*) respondents stayed at least one night in a hospital, nursing home, or other medical setting because of a physical health problem in the past 12 months. Physical health outpatient care utilization was measured by whether (0 = *no*, 1 = *yes*) participants had received treatment for a physical health problem in an office, clinic, or emergency room in the past 6 months.

Results

Comparisons Between Male and Female Veterans

Comparisons were made to explore potential differences between male and female veterans

on hypothesized model variables (see Table 1). To reduce Type I error that might occur in exploratory comparisons of men and women across the 12 model variables, the Bonferroni correction was used, resulting in an alpha of .004. Comparisons revealed significant medium to large effect size differences in comparing men and women on hypothesized predictor variables. Compared with female veterans, male veterans were younger, were less likely to be White, were less likely to be married, had significantly higher combat exposure, were more likely to be insured, and had lower family incomes. In addition, men demonstrated higher PTSD severity scores and total *DSM-III-R* diagnoses, but lower physical health problems. Turning to hypothesized outcome variables, women were significantly more likely to use physical health outpatient care services in comparison to men. Differences between men and

women on mental health care utilization and physical health inpatient care utilization were nonsignificant.

Analytic Strategy for Path Models

The hypothesized service utilization path models were computed using Mplus version 2.01 (Muthén & Muthén, 2001a). As indicated in Table 1, all three service utilization outcome variables were dichotomous. Therefore, to appropriately estimate the statistical relationships within model pathways involving dichotomous outcome variables, service utilization variables were submitted to the Mplus program as categorical. To account for the dichotomous nature of these variables, Mplus computes biserial correlations for pathways involving dichotomous outcomes and continuous predictors and tetrachoric correlations for

Table 1
Descriptive Statistics and Between-Gender Comparisons

Variable	Male veterans		Female veterans		Between-gender comparison	ES ^a
	%	<i>M</i> (<i>SD</i>)	%	<i>M</i> (<i>SD</i>)		
Age		46.42 (8.14)		41.54 (5.35)	<i>t</i> (1630) = -14.01*	.70
White					$\chi^2(1, N = 1,365) = 128.02^*$.28
No	4		30			
Yes	96		70		$\chi^2(1, N = 1,632) = 118.36^*$	-.27
Married						
No	48		21			
Yes	52		79			
Combat exposure		-0.32 (0.25)		0.12 (0.62)	<i>t</i> (1617) = 14.06*	.70
Insurance					$\chi^2(1, N = 1,629) = 17.97^*$.11
No	17		13			
Yes	83		87			
Family income		19.18 (2.46)		17.83 (3.76)	<i>t</i> (1571) = -6.82*	.34
Mississippi Scale for PTSD		63.04 (17.19)		75.96 (22.37)	<i>t</i> (1617) = 10.86*	.54
<i>DSM-III-R</i> total diagnoses		0.47 (0.93)		0.93 (1.26)	<i>t</i> (1630) = 6.75*	.33
Physical health problems		0.06 (0.06)		0.04 (0.05)	<i>t</i> (1630) = -5.28*	.26
Mental health use					$\chi^2(1, N = 1,632) = 1.76$.03
No	83		79			
Yes	17		21			
Physical health inpatient use					$\chi^2(1, N = 1,632) = 5.11$.06
No	88		91			
Yes	11		9			
Physical health outpatient use					$\chi^2(1, N = 1,622) = 44.52^*$.17
No	46		65			
Yes	54		35			

Note. Percentages are reported for dichotomous variables. Means and standard deviations are reported for continuous variables. ES = effect size; PTSD = posttraumatic stress disorder; *DSM-III-R* = *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 1987).

^a *d* reported for continuous variables and phi reported for dichotomous variables.

* $p < .004$.

pathways involving dichotomous outcomes and dichotomous predictors. For bivariate pathways involving continuous outcomes, Mplus uses Pearson product-moment correlations as the basis for the solution (Muthén & Muthén, 2001b).

Given the statistical differences involving comparisons of male and female veterans and theoretical interest of model differences between these two groups, separate path models were computed for each gender. To allow for direct comparisons of pathways between nested male and female veteran samples, we report unstandardized path coefficients unless otherwise noted. This analytic strategy allows for comparison of the relative strength of individual model pathways across genders by using the untransformed, original scale values, which are identical between male and female veterans. However, for within-model comparisons of pathways, it is more meaningful to use the standardized path coefficients, as this provides a means of directly comparing relationships that involve different raw scale values (for a discussion, see Cohen, Cohen, West, & Aiken, 2003). Therefore, we note that when describing within-model comparisons of statistical pathways, standardized coefficients are reported.

Kenny, Kashy, and Bolger's (1998) criteria for determining statistical mediation were used. Following these criteria, we established a direct association between predisposing and enabling variables through preliminary path models before entering need variables as mediators. To streamline our results, the final path models involving need variables as mediators are presented. Results of preliminary models are available from us on request.

Mediational Path Models for Male and Female Veterans

Results of the path models largely supported the Anderson and Bartkus (1973) model in showing that predisposing and enabling variables predicted need variables, which in turn predicted higher likelihood of health care service utilization (see Figures 1 and 2). Supporting the central importance of need variables, physical health problems were found to account for the effects of predisposing and enabling factors on physical health inpatient and outpatient care service utilization (see Figures 1 and 2). Specifically, Sobel tests (see Baron &

Kenny, 1986) revealed that the relationship between combat exposure and physical health inpatient care service utilization was fully explained by higher physical health problems for male and female veterans, $t(1,124) = 4.36, p < .001$, and $t(407) = 3.27, p = .001$, respectively. For both groups, this suggested that the effects of higher combat exposure predicting higher physical health inpatient care service utilization were explained by the positive relationship of combat exposure to physical health problems. However, it is noteworthy that the magnitude of this indirect pathway was 2.7 times stronger for women (unstandardized indirect effect = .27) than for men (unstandardized indirect effect = .10). In addition, higher physical health problems fully explained the positive relationship between age and physical health outpatient care service utilization for men, Sobel $t(1,124) = 11.77, p < .001$, unstandardized indirect effect = .01, and Sobel $t(1,124) = -1.55, p = .12$, unstandardized indirect effect = -.001, respectively, whereas higher physical health problems indirectly explained the positive relationship between combat exposure and physical health care service utilization for women, Sobel $t(407) = 3.93, p < .001$, unstandardized indirect effect = .01, and Sobel $t(407) = -3.64, p < .001$, unstandardized indirect effect = -.01, respectively.

Turning to other model pathways, need variables were consistently shown to account for the negative association between family income and mental health care service utilization. Specifically, PTSD partially mediated the negative relationship between family income and mental health care service utilization for men and women, Sobel $t(1,124) = -4.06, p < .001$, unstandardized indirect effect = -.02, and Sobel $t(407) = -3.42, p < .001$, unstandardized indirect effect = -.02, respectively. Total psychiatric diagnoses also partially mediated the negative relationship between family income and mental health care service utilization for men and women, Sobel $t(1,124) = -3.52, p < .001$, unstandardized indirect effect = -.01, and Sobel $t(407) = -3.68, p < .001$, unstandardized indirect effect = -.02, respectively. In addition, higher family income was shown to indirectly predict less likelihood for mental health care service utilization via lower physical health problems among men, Sobel $t(1,124) = -3.64, p < .001$, unstandardized indirect ef-

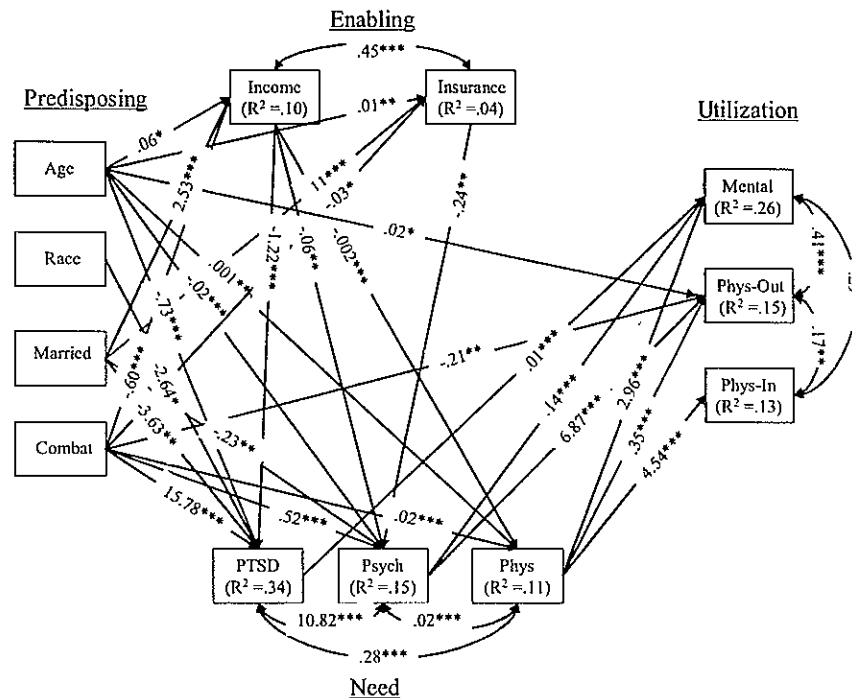


Figure 1. Unstandardized Mplus path model testing need variables as mediators of predisposing and enabling variables on utilization outcomes for male veterans ($n = 1,126$). Race (0 = White, 1 = non-White); married (0 = no, 1 = yes); combat = combat exposure severity; income = yearly family income; insurance (0 = no, 1 = yes); PTSD = Mississippi Scale for PTSD; psych = total psychiatric diagnoses; phys = standardized physical health problems; mental = mental health utilization (0 = no, 1 = yes); phys-out = physical health outpatient utilization (0 = no, 1 = yes); phys-in = physical health inpatient utilization (0 = no, 1 = yes). * $p < .05$. ** $p < .01$. *** $p < .001$.

fect = $-.01$. Taken together, these results indicate that higher family income might safeguard veterans against need for mental health care services, thereby lowering veterans' mental health care service utilization.

PTSD was shown to be the most important variable in explaining the relationship between combat exposure and mental health care service utilization among male veterans (see Figure 1). Results from the mediation path solution for men demonstrating the effects of combat exposure in predicting mental health care service utilization were entirely explained by the three need variables. In examining the specific indirect pathways, the magnitude of indirect effects from combat exposure to mental health care service utilization through total psychiatric diagnoses and physical health problems were identical, So-

bel $t(1,124) = 3.67$, $p < .001$, standardized indirect effect = $.04$, unstandardized indirect effect = $.07$, and Sobel $t(1,124) = -2.33$, $p = .02$, standardized indirect effect = $.04$, unstandardized indirect effect = $.07$, respectively. However, the magnitude of indirect effects from combat exposure to mental health care service utilization through PTSD was more than three times as large as the indirect effects of combat exposure through total psychiatric diagnoses and physical health problems, Sobel $t(1,124) = 4.52$, $p < .001$, standardized indirect effect = $.13$, unstandardized indirect effect = $.22$. This suggested that although men's total psychiatric diagnoses and physical health problems partially explained the relationship between combat exposure and mental health care service utilization, the central variable in ex-

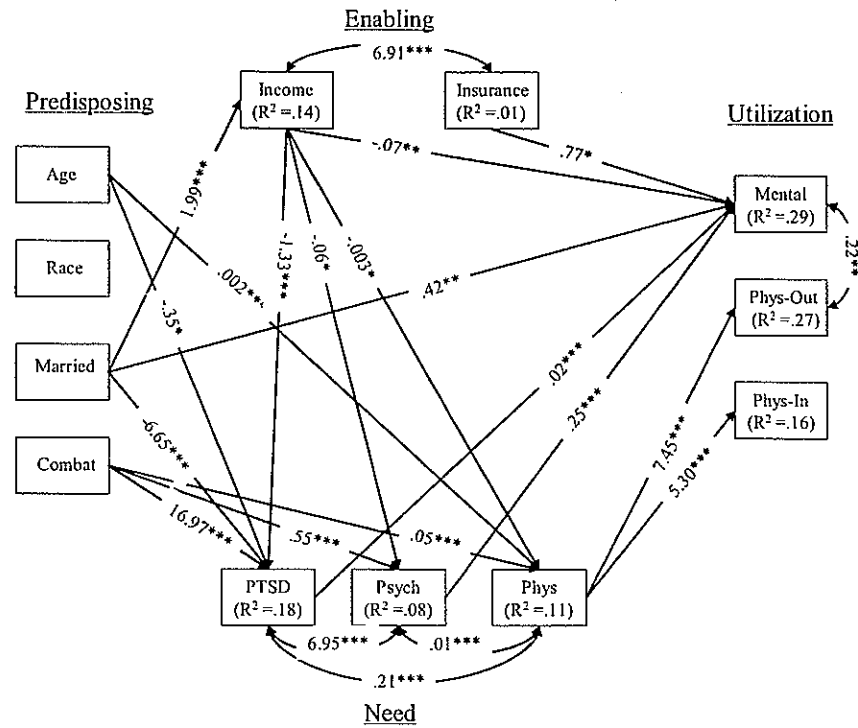


Figure 2. Unstandardized Mplus path model testing need variables as mediators of predisposing and enabling variables on utilization outcomes for female veterans ($n = 409$). Race (0 = White, 1 = non-White); married (0 = no, 1 = yes); combat = combat exposure severity; income = yearly family income; insurance (0 = no, 1 = yes); PTSD = Mississippi Scale for PTSD; psych = total psychiatric diagnoses, phys = standardized physical health problems; mental = mental health utilization (0 = no, 1 = yes); phys-out = physical health outpatient utilization (0 = no, 1 = yes); phys-in = physical health inpatient utilization (0 = no, 1 = yes). * $p < .05$. ** $p < .01$. *** $p < .001$.

plaining the relationship between combat exposure and higher mental health care service utilization was higher PTSD.

Discussion

In an era in which male and female veterans will be returning from deployments to Iraq and Afghanistan, understanding the relationships among predisposing, enabling, need, and utilization variables becomes increasingly important, especially as we prepare to serve veterans with competing needs in the health care arena. Although this study was conducted with veterans of a different era with different war zone exposure, this study can help shed some light on what types of variables we can expect to help explain the variance in seeking mental and

physical health care. Understanding these predictors can help inform screening and outreach efforts as we prepare to help new veterans of modern deployments adjust and cope with multiple needs on their homecoming.

Our results support hypotheses of the Anderson model of health care service utilization (Anderson & Bartkus, 1973), demonstrating that for male and female Vietnam veterans, predisposing variables (e.g., age and combat exposure) are largely indirect predictors of health care service utilization, such that the relationships from predisposing variables to service utilization outcomes are mostly explained through enabling (i.e., income and insurance availability) and need variables (i.e., PTSD, total psychiatric diagnoses, and physical health problems). Relative to enabling variables, need fac-

tors were shown to be the most consistent and strongest mediators of predisposing variables in predicting service utilization. For example, the positive and significant relationship between combat exposure and inpatient physical health care utilization became nonsignificant and was fully accounted for by physical health problems when this was added to the model. Drawing from these findings, a general conclusion might be that health care policymakers would be wise to consider psychiatric and physical health need variables as central in predicting veterans' health care utilization.

Combat exposure was an important predisposing variable for many of the mediated relationships, leading to greater physical and mental health care service utilization via a number of need variables. Physical health problems mediated the relationship between combat exposure and physical health inpatient care utilization for both genders and between combat exposure and physical health outpatient care utilization for women. For men, combat exposure was an important predisposing variable in that it indirectly predicted mental health care utilization through the three need variables. Although all three need variables mediated the relationship between men's combat exposure and mental health care utilization, the indirect effects of PTSD were shown to be about three times greater than the indirect effects of physical health problems and total mental health diagnoses. This suggests that although physical and other mental health diagnoses play a role, we should perhaps be focusing on PTSD symptoms to better understand the circumstances in which individuals reach out for mental health care. These findings may have important clinical implications for returning Iraq and Afghanistan veterans. If PTSD symptoms are what drive veterans to seek services, we should be helping veterans cope with and identify these symptoms before they become exacerbated.

Another factor that will be important to consider is the increasing combat role for women in modern wars and how this change may affect these findings. The Vietnam veteran women in this study were older and mostly in nursing roles. The military roles of the newly returning female veterans of Iraq and Afghanistan are likely to be quite diverse from those who served in Vietnam, resulting in different and perhaps more direct combat exposure. Since the first

Gulf War, women have served in combat support roles, and as a result reported exposure to combat has increased. Therefore, it will be critical to better understand how these predisposing, enabling, need, and utilization factors act together following combat exposure for women in modern deployments. In other words, will the effects of gender decrease over time once combat exposure becomes more equal among soldiers?

Family income was found to be an important enabling variable among veterans. Specifically, our results showed that greater financial resources were inversely related to health care utilization. This relationship was also partially explained through higher income predicting lower PTSD, total psychiatric diagnoses, and physical health symptoms, which in turn predicted mental health care utilization. These results are consistent with conservation of resources theory (Hobfoll, 2002), which predicts that individuals who are able to retain and cultivate greater economic or psychosocial resources in the face of traumatic experiences will demonstrate better psychological outcomes. In this way, higher income might serve as a resource to buffer the impact of combat exposure, lessening veterans' psychiatric and physical health needs for services. Conversely, lower income may serve as a stressor, adding to a list of cumulative stressors that may tax individuals and make them more vulnerable to a host of mental and physical symptoms as a result of depleted resources.

There are several limitations of this study that should be noted. First, this study is cross-sectional in nature. Future studies should attempt to model these relationships within a longitudinal framework to better understand how these relationships withstand the test of time. Future studies should also examine moderated relationships to shed light on relationships that may not be clearly linear in nature, especially concerning some of the predisposing factors. Second, this study was conducted with Vietnam veterans many years after returning from their deployments, and as a result these findings may not be generalizable to other veterans or to other populations. The female veterans in this study were different from the male veterans in that most were nurses in Vietnam, and they were more likely to be older and unmarried (see Table 1). As previously noted, female veterans

in this study were also very different from current female veterans both demographically and in the roles they assumed in the military, which limits generalizability. The retrospective nature of this study should also be noted as a limitation, as should the fact that since these data were collected, the VA health care system has improved significantly, especially with respect to PTSD treatment, which may further limit generalizability. In addition, although dichotomous outcome variables may reduce recall errors when service utilization is reported retrospectively, thus providing more reliable measurement, dichotomous variables may also artificially deflate outcome variance, which should be noted when interpreting these findings.

What emerged from this study is that although need variables seemed to be the most crucial in explaining service utilization, many of these relationships were different for male and female veterans. Although for male veterans the hypothesized models best explained mental health care utilization, for female veterans these models best accounted for the variance in physical health care utilization. Similar differences have been documented in the past. In a study including 1,000 women who served in a heavy armor division as part of Operation Desert Storm, although male and female soldiers presented with similar physical health complaints, women made proportionately more visits to sick call than men (Hines, 1992, 1993). This trend is reflected in the current data and may explain some of the different findings based on gender. In addition, the role of PTSD symptoms as a precursor to mental health care service utilization cannot be understated. Programs such as the one instituted by the Department of Defense in which newly returning veterans are screened early for symptoms (i.e., on their return and at 90- to 180-day follow-up) are important in helping to identify those who need mental health intervention before symptoms become exacerbated or entrenched. Intervening early on with veterans may help decrease the systemic burden by implementing preventative measures that can target symptoms in a preliminary phase (Litz, 2004). Finally, the role of resources is important and seems to be inversely related to symptoms. Ensuring that veterans have adequate resources on homecoming may help prevent taxing of already depleted systems,

which may in turn help with a smoother adjustment on homecoming. Overall, there are a number of factors that act together to predict service utilization, and each of these pieces adds important information to the larger picture. Gender differences are important to note, and we should be attuned to these differences as we witness male and female veterans returning from difficult and challenging deployments in the present and future.

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